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UNITED STATES PATENT APPLICATION

OF

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FOR

DRYING APPARATUS HAVING FRONT SUPPORT MOUNTING ASSEMBLY

[0001] This application claims the benefit of Korean Application No. 10-2002-0078346 filed on December 10, 2000, which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a drying apparatus, such as a laundry dryer, having a front support mounting assembly, and more particularly to a drying apparatus having a front support mounting assembly, employing a fixing bracket for fixing a front support directly to a cabinet.

Discussion of the Related Art

[0003] Generally speaking, an apparatus for drying washed laundry, which may include a laundry dryer or a drum-type washing machine, performs drying by directing hot air generated from a heater into a rotating drying chamber, or drum, holding the laundry. Typically, the drum has an open end at its front and is installed horizontally with respect to a cabinet of the apparatus. The open front end of the drum should be rotatably supported on the front side of the cabinet, which has an entrance hole for providing access to the drum's interior. To support the open front end of the drum, the apparatus according to a related art is provided with a front support mounting assembly as illustrated in FIGS. 1 and 2, which show a laundry dryer having a front support mounting assembly.

[0004] Referring to FIG. 1, a laundry dryer according to a related art is comprised of a cabinet 26 having a laundry entrance 28a centrally formed in a front cabinet cover 28; a rotatable drum 8, horizontally secured within the cabinet, for holding laundry and having an open end and a closed end; and a front support 12, disposed between the drum and the front cabinet cover of the cabinet, for rotatably supporting the open end of the drum while allowing

access to the drum's interior through a laundry opening 12a, which is centrally formed in the front support and has a slightly greater diameter than the laundry entrance of the front cabinet cover of the cabinet. The entrance 28a of the front cabinet cover 28 of the cabinet 26 receives a door 38 having a door glass 38a for viewing the interior of the drum 8 via the laundry hole 28a of the front support 28. The front support 12 is fixed to the front cabinet cover 28 using a plurality of coupling members 40, and then the front cabinet cover is mounted to the front of the cabinet 26 to complete the assembly, such that the front support is indirectly fixed to the cabinet via the front cabinet cover.

[0005] Referring to FIG. 2, the front support 12 comprises an annular guide 12b, protruding rearward, to provide rotatable support to the drum 8 by receiving the open end of the drum on a set of guide rollers (not shown) in contact with an outer surface of the open end of the drum. A seal 42 is provided for closing a gap between the drum 8 and the front support 12, to prevent escape of the hot air of the drying chamber, i.e., the drum. To facilitate the coupling between the drum 8 and the front support 12, at both the rotatably supported contact surface and the sealed gap, a consistent distance should be maintained for the opposing surfaces of the drum and the front support.

[0006] According to the front support mounting assembly constructed as above, however, the distance between the opposing surfaces of the drum 8 and the front support 12 is uneven due to the above-described indirect coupling, whereby the front support is fixed to the front cabinet cover 28 which is then fixed to the cabinet 26. As a result of the inconsistent distances, dryer operation and performance is degraded. Specifically, the installation of the front support 12 to the front cabinet cover 28 and the cabinet 26 is insecure or weakens over time, and the seal 42 tends to fail. Moreover, loading the front support 12 during assembly is cumbersome, which reduces manufacturing productivity accordingly.

SUMMARY OF THE INVENTION

[0007] Accordingly, the present invention is directed to a drying apparatus having a front support mounting assembly that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

[0008] An object of the present invention, which has been devised to solve the foregoing problem, lies in providing a drying apparatus having a front support mounting assembly, which maintains an even gap between the drum and the front support of the drum.

[0009] It is another object of the present invention to provide a drying apparatus having a front support mounting assembly, which improves manufacturing productivity and simplifies repair of the drying apparatus, by facilitating installation of the front support.

[0010] It is another object of the present invention to provide a drying apparatus having a front support mounting assembly, which enhances dryer performance by facilitating a seal between the drum and the front support.

[0011] It is another object of the present invention to provide a drying apparatus having a front support mounting assembly, in which improves dryer operation and reliability.

[0012] Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent to those having ordinary skill in the art upon examination of the following or may be learned from a practice of the invention. The objectives and other advantages of the invention will be realized and attained by the subject matter particularly pointed out in the specification and claims hereof as well as in the appended drawings.

[0013] To achieve these objects and other advantages in accordance with the present invention, as embodied and broadly described herein, there is provided a drying apparatus

having a front support mounting assembly. The assembly comprises a cabinet; a rotatable drum, horizontally installed within the cabinet as a drying chamber for holding an object to be dried, the rotatable drum having an open end; a front support for rotatably supporting the open end of the rotatable drum; and means for fixing the front support directly to the cabinet. The fixing means comprises a cabinet-fixing flange, formed at a first end, for providing a first mounting surface for coupling with the mounting flange; a front support-fixing flange, formed at a second end, for providing a second mounting surface for coupling with the front support; and an extension link, extending from the cabinet-fixing flange to the front support-fixing flange, for compensating for a mounting offset between the first and second mounting surfaces.

[0014] It is to be understood that both the foregoing explanation and the following detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0016] FIG. 1 is an exploded perspective view of a laundry dryer according to a related art;

[0017] FIG. 2 is a partially cutaway side view of the laundry dryer shown in FIG. 1, illustrating a front support mounting assembly according to a related art;

[0018] FIG. 3 is an exploded perspective view of a drying apparatus according to the

present invention;

[0019] FIG. 4 is a front view of the drying apparatus of FIG. 3, shown in an intermediate stage of assembly to illustrate a front support mounting assembly according to the present invention;

[0020] FIG. 5 is an exploded perspective view of the fixing means of a front support mounting assembly according to the present invention;

[0021] FIG. 6A is a cross-sectional view of the fixing bracket, cut along a line A-A in FIG. 5; and

[0022] FIG. 6B is a cross-sectional view of the fixing bracket, cut along a line B-B in FIG. 5.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0023] Reference will now be made in detail to the preferred embodiment of the present invention, examples of which are illustrated in the accompanying drawings. Throughout the drawings, like elements are indicated using the same or similar reference designations where possible.

[0024] The present invention is directed to a drying apparatus having a front support mounting assembly, embodied herein as a laundry dryer. The front support mounting assembly of the present invention may be adopted in a drum-type washing machine having a dryer function using a sealed drying chamber.

[0025] Referring to FIGS. 3-5, a laundry dryer according to the present invention is comprised of a cabinet 76 having a laundry entrance 78a centrally formed in a front cabinet cover 78; a rotatable drum 58, horizontally secured within the cabinet, for holding laundry and having an open end and a closed end; and a front support 62, disposed between the drum

and the front cabinet cover of the cabinet, for rotatably supporting the open end of the drum while allowing access to the drum's interior through a laundry opening 62a, which is centrally formed in the front support and has a slightly greater diameter than the laundry entrance of the front cabinet cover of the cabinet. The entrance 78a of the front cabinet cover 78 of the cabinet 76 receives a door 88 having a door glass 88a for viewing the interior of the drum 58 via the laundry hole 78a of the front support 78.

[0026] As in the case of the related art apparatus, the front support 62 comprises an annular guide, protruding rearward, to provide rotatable support to the drum 58 by receiving the open end of the drum on a set of guide rollers in contact with an outer surface of the open end of the drum. A seal (42 of FIG. 2) is provided for closing a gap between the drum 58 and the front support 62, to prevent escape of the hot air of the drum.

[0027] According to the front support mounting assembly of the present invention, the front support 62 is fixed directly to the cabinet 76, using a fixing means comprised of a plurality of fixing brackets 92. To this end, the cabinet 76 is provided with a mounting flange 94, which is a surface formed by inwardly bending a forward edge of the cabinet, and the front support 62 is provided with four corner flanges having a symmetrical arrangement for receiving a plurality of fixing brackets 92. Each fixing bracket 92 comprises a cabinet-fixing flange 96 formed at one end and a front support-fixing flange 98 formed at the other end. The ends of the fixing bracket 92 are respectively fixed to the mounting flange 94 of the cabinet 76 at a first mounting surface and to a corner flange of the front support 62 at a second mounting surface. Each fixing bracket 92 further comprises an extension link 100, extending from the cabinet-fixing flange 96 to the front support-fixing flange 98. The extension link 100 extends to a length compensating for a mounting offset between the first and second mounting surfaces. Since the drum 58 is securely installed within the cabinet 76

and the front support 62 is securely fixed to the cabinet, the length of the extension link 100 of the fixing means maintains a consistent distance between opposing surfaces of the drum and the front support.

[0028] The cabinet-fixing flange 96 of the fixing bracket 92 is bent from a front end of the extension link 100 in one direction, while the front support-fixing flange 98 of the fixing bracket is bent from a rear end of the extension link 100 in the opposite direction. The angles formed by the respective bends are substantially right angles with respect to the extension link 100 and are complementary angles, such that the cabinet-fixing flange 96 and front support-fixing flange 98 extend in opposite directions, thus providing for a substantially parallel coupling of the front support 62 with respect to the mounting flange 94 of the cabinet 76. That is, the first and second mounting surfaces are desirably parallel.

[0029] The fixing bracket 92 comprises at least one reinforcing bead 118, protruding from one side surface of the fixing bracket toward the laundry opening 62a of the front support 62 and having a channeled cross-section with a raised surface running parallel to the surface of the fixing bracket, to provide added support for the weight of the front support 62 and reinforce the rigidity of the coupling. Preferably, a plurality of reinforcing beads 118 are formed on the fixing bracket 92 and are arranged in rows. As shown in FIGS. 6A and 6B, each reinforcing bead 118 protrudes from the extension link 100 of the fixing bracket 92, with the forward end of the protrusion occurring at the cabinet-fixing flange 96 of the fixing bracket and the rearward end of the protrusion occurring at the front support-fixing flange 98 of the fixing bracket.

[0030] To fix the cabinet-fixing flange 96 to the cabinet 76, a pair of T-shaped hanging protrusions 108 are provided on a rear surface of the cabinet-fixing flange, respectively disposed at upper and lower hanging points, and a pair of slotted hanging holes

110, disposed to correspond to the hanging protrusions, are formed in the mounting flange 94, each providing a wide top opening tapered to a narrow bottom opening so that the hanging protrusions can be inserted in the top ends of the hanging holes to be caught in the bottom ends thereof under the weight of the fixing bracket 92. Thus, the fixing bracket 96 is hung on the cabinet 76. The thus-hung fixing bracket 92 is fixed to the cabinet 76 using a fixing member 116 secured into a set of fixing holes 112a and 112b respectively formed in the cabinet-fixing flange 96 and the mounting flange 94. In the event that the above set of fixing holes becomes excessively worn through repeated use, or is damaged, a spare set of fixing holes 114a and 114b may be adjacently provided.

[0031] To fix the front support-fixing flange 98 to the front support 62, the fixing bracket 92 should be properly oriented with respect to the front support. Thus, at least two sets of jig holes 104a and 104b, for receiving jig pins 102 are correspondingly formed in the front support-fixing flange 98 and the front support 62. The front support-fixing flange 98 may be fixed to the front support 62 by welding or by at least one coupling means (not shown) comprised of a fixing hole and a fixing member, such as fixing hole 112a and 112b and fixing member 116, since it would be advantageous for the front support-fixing flange to be separable from the front support. To facilitate welding, a plurality of welding protrusions 106, protruding toward the front support 62, are provided on a rear surface of the front support-fixing flange 98, to be welded to the front support.

[0032] In assembling a laundry dryer adopting the present invention, the jig holes 104b of the front support 62 are aligned with the jig holes 104a of the front support-fixing flange 98, and the jig pins 102 are inserted. With the fixing bracket 92 thus positioned, the welding protrusions 106 are welded to the front surface of a corner flange of the front support 62, using for example an arc welding technique. Each fixing brackets 92 is similarly fixed to

a corresponding corner flange of the front support 62.

[0033] Subsequently, the front support 62 and fixing bracket 92 assembly is positioned with respect to the cabinet 76 at the mount flange 94 provided on the cabinet's forward edge, while inserting the guide protrusion (12b of FIG. 2) into the open end of the drum 58. In doing so, the hanging protrusions 108 of the cabinet-fixing flange 96 are respectively inserted into the wide top ends of the hanging holes 110 of the mounting flange 94 and lowered so that the front support 62 hangs on the front of the cabinet 76. Then, the fixing member 116 is fitted to the fixing holes 112a and 112b for each fixing bracket 92. The spare fixing holes 114a and 114b are left open.

[0034] By adopting the above-described front support mounting assembly to a laundry dryer according to the present invention, the front support is fixed directly to the cabinet using the fixing brackets, while maintaining a consistent distance between opposing surfaces of the drum and the front support. In doing so, manufacturing productivity is improved and repair of the drying apparatus is simplified, by facilitating installation of the front support. In addition, dryer performance is enhanced by facilitating a seal between the drum and the front support, and dryer operation and reliability are improved by providing a secure installation of the front support.

[0035] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover such modifications and variations, provided they come within the scope of the appended claims and their equivalents.